PSYC 480
Genes and Cognition
Fall, 2014
Wednesday 1:00 - 3:30 PM
Sewall Hall 462

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Office Hours: Tues 11:00 - 12:00, Wed 11:00 - 12:00

Course Objectives and Learning Outcomes

This class is a seminar covering basic research in associations between genes and behavior. The focus is on cognition, but we will also cover topics on the behavioral side ranging from attention, perception, and psycholinguistics to aspects of psychopathology. Because this class is a *seminar*, we will read and discuss. I will do very little formal lecturing. This also means that you should be prepared to discuss the readings each week.

Exams and Papers, Grade Policies

The formal contributions to your grade in the course will be: 1) your participation in class each week, 2) a brief, one paragraph summary of each of the articles, and 3) a paper on a topic of your choosing at the end of the semester. Late papers or weekly reading summaries will not be accepted. I cannot emphasize enough the importance of bringing your unique talents and perspectives to the class discussion each week. We all have different sets of knowledge and perspectives on these topics, so the class will be enriched to the extent that you share that knowledge and those perspectives with the class. This also means that you should not be afraid to ask questions once you have tried your best to understand the readings each week. You should be prepared to lead a discussion on any of the articles that are assigned each week. This means, among other things, summarizing the main points of the article and asking questions about points that you might not have understood.

The one-paragraph summaries should be written in a single file (e.g., a Word File). This is like a journal of your summaries on the readings. I will collect this file from you twice during the semester: once around midterm and once at the end of the course. For each article that we read in class, you should first reference the article in APA format and follow that by your one paragraph summarizing the reading. An example is shown at the end of the syllabus.

Absence Policies

You will be expected to attend all class sessions. If for some reason, you cannot attend, please let me know at least 12 hours in advance via an email message. Please also state the reason for your absence.

Required Texts and Materials

The required text for the course will be:

Plomin, R., DeFries, J. C., Knopic, V. S., & Neiderhiser, J. M. (2013). *Behavioral Genetics - 6th Edition*. New York: Worth Publishers.

You might also consider investing in one or two other texts although *they will not be required*. Here are some suggestions:

Sudbery, P., & Sudbery, I. (2009). *Human molecular genetics*. Harlow, England: Pearson.

Griffiths, A. J. F., Wessler, S. R., Lewontin, R. C., & Carroll, S. B. (2008). *Introduction to genetic analysis*. New York: W. H. Freeman.

Don't let the latter texts scare you away. They are fairly technical, but the course is not intended to cover the highly technical aspects of modern molecular genetics. Rather, you might use these texts as resources should a question arise in your reading.

Additionally, I will make available original research articles to be read and discussed in class. The readings for the following week will be assigned in class or in an Owlspace announcement each week. Most of the readings are available on the course web site on Owlspace.

Rice Honor Code

In this course, all students will be held to the standards of the Rice Honor Code, a code that you pledged to honor when you matriculated at this institution. If you are unfamiliar with the details of this code and how it is administered, you should consult the Honor System Handbook at http://honor.rice.edu/honor-system-handbook/. This handbook outlines the University's expectations for the integrity of your academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process.

Disability Support Services

If you have a documented disability or other condition that may affect academic performance you should: 1) make sure this documentation is on file with Disability Support Services (Allen Center, Room 111 / adarice@rice.edu / x5841) to determine the accommodations you need; and 2) talk with me to discuss your accommodation needs.

Syllabus Change Policy

This syllabus is only a guide for the course and is subject to change with advanced notice.

Tentative Schedule for reading and discussing the text chapters. In addition to reading the text chapters, I will also assign one or two original research articles to be read and discussed in class.

Date	**Assignment (Chapters from BG book)**
August 26	Introduction; Listen to *This American Life: The Ghost of Bobby Dunbar*
September 2	no text readings
September 9	1, 2
September 16	3, 4
September 23	5, 6
September 30	7, 8
October 7	9, 10
October 14	11, 12
October 21	14, 15
October 28	16
November 4	Turn in brief description of the topic for your final paper

References

Caspi, A., McClay, J., Moffitt, T. E., Mill, J., Martin, J., Craig, I. W., … Poulton, R. (2002). Role of genotype in the cycle of violence in maltreated children. *Science, 297(5582)*, 851–4. doi: 10.1126/science.1072290

Hatemi, P. K., Medland, S. E., Klemmensen, R., Oskarsson, S., Littvay, L., Dawes, C. T., … Martin, N. G. (2014). Genetic influences on political ideologies: twin analyses of 19 measures of political ideologies from five democracies and genome-wide findings from threepopulations. *Behav Genet, 44(3)*, 282–94. doi:10.1007/s10519-014-9648-8

Horváth, S. & Mirnics, K. (2014). Schizophrenia as a disorder of molecular pathways. *Biol Psychiatry.* doi:10.1016/j.biopsych.2014.01.001

Huc-Chabrolle, M., Charon, C., Guilmatre, A., Vourc'h, P., Tripi, G., Barthez, M. A., …

Bonnet-Brilhault, F. (2013). Xq27 fraxa locus is a strong candidate for dyslexia: evidencefrom a genome-wide scan in french families. *Behav Genet, 43(2)*, 132–40. doi:10.1007/s10519-012-9575-5

Kingsmore, S. (2012). Comprehensive carrier screening and molecular diagnostic testing for recessive childhood diseases. *PLoS Curr,* e4f9877ab8ffa9. doi:10.1371/4f9877ab8ffa9

Krushkal, J., Murphy, L. E., Palmer, F. B., Graff, J. C., Sutter, T. R., Mozhui, K., … Adkins, R. M. (2014). Epigenetic analysis of neurocognitive development at 1 year of age in a community-based pregnancy cohort. *Behav Genet, 44(2)*, 113–25. doi:10.1007/s10519-014-9641-2

Li, Z., Chang, S.-H., Zhang, L.-Y., Gao, L., & Wang, J. (2014). Molecular genetic studies of adhd and its candidate genes: a review. *Psychiatry Res, 219(1)*, 10–24. doi:10.1016/j.psychres.2014.05.005

Marioni, R. E., Davies, G., Hayward, C., Liewald, D., Kerr, S. M., Campbell, A., … Deary, I. J. (2014). Molecular genetic contributions to socioeconomic status and intelligence. *Intelligence, 44(100),* 26–32. doi:10.1016/j.intell.2014.02.006

McDowell, G. A., Mules, E. H., Fabacher, P., Shapira, E., & Blitzer, M. G. (1992). The presence of two different infantile tay-sachs disease mutations in a cajun population. *Am J Hum Genet, 51(5)*, 1071–7.

Robinson, E. B., Koenen, K. C., McCormick, M. C., Munir, K., Hallett, V., Happé, F., … Ronald, A. (2012). A multivariate twin study of autistic traits in 12-year-olds: testing the fractionable autism triad hypothesis. *Behav Genet, 42(2)*, 245–55. doi:10.1007/s10519-011-9500-3

Tordjman, S., Somogyi, E., Coulon, N., Kermarrec, S., Cohen, D., Bronsard, G., … Xavier, J. (2014). Gene×environment interactions in autism spectrum disorders: role of epigenetic mechanisms. *Front Psychiatry, 5*, 53. doi:10.3389/fpsyt.2014.00053

Trzaskowski, M., Davis, O. S. P., DeFries, J. C., Yang, J., Visscher, P. M., & Plomin, R. (2013). Dna evidence for strong genome-wide pleiotropy of cognitive and learning abilities. *Behav Genet, 43(4)*, 267–73. doi:10.1007/s10519-013-9594-x

Woldemichael, B. T., Bohacek, J., Gapp, K., & Mansuy, I. M. (2014). Epigenetics of memory and plasticity. *Prog Mol Biol Transl Sci, 122,* 305–40. doi:10.1016/B978-0-12-420170-5.00011-8

References by Topic

Gene x Environment Interactions: Propensity to Violence

Caspi, A., McClay, J., Moffitt, T. E., Mill, J., Martin, J., Craig, I. W., … Poulton, R. (2002). Role of genotype in the cycle of violence in maltreated children. *Science, 297(5582)*, 851–4. doi: 10.1126/science.1072290

Childhood Neurological Disorders: Tay-Sachs

Kingsmore, S. (2012). Comprehensive carrier screening and molecular diagnostic testing for recessive childhood diseases. *PLoS Curr,* e4f9877ab8ffa9. doi:10.1371/4f9877ab8ffa9

McDowell, G. A., Mules, E. H., Fabacher, P., Shapira, E., & Blitzer, M. G. (1992). The presence of two different infantile tay-sachs disease mutations in a cajun population. *Am J Hum Genet, 51(5)*, 1071–7.

General Cognitive Ability

Marioni, R. E., Davies, G., Hayward, C., Liewald, D., Kerr, S. M., Campbell, A., … Deary, I. J. (2014). Molecular genetic contributions to socioeconomic status and intelligence. *Intelligence, 44(100),* 26–32. doi:10.1016/j.intell.2014.02.006

Trzaskowski, M., Davis, O. S. P., DeFries, J. C., Yang, J., Visscher, P. M., & Plomin, R. (2013). Dna evidence for strong genome-wide pleiotropy of cognitive and learning abilities. *Behav Genet, 43(4)*, 267–73. doi:10.1007/s10519-013-9594-x

Dyslexia

Huc-Chabrolle, M., Charon, C., Guilmatre, A., Vourc'h, P., Tripi, G., Barthez, M. A., … Bonnet-Brilhault, F. (2013). Xq27 fraxa locus is a strong candidate for dyslexia: evidencefrom a genome-wide scan in french families. *Behav Genet, 43(2)*, 132–40. doi:10.1007/s10519-012-9575-5

Epigenetics

Krushkal, J., Murphy, L. E., Palmer, F. B., Graff, J. C., Sutter, T. R., Mozhui, K., … Adkins, R. M. (2014). Epigenetic analysis of neurocognitive development at 1 year of age in a community-based pregnancy cohort. *Behav Genet, 44(2)*, 113–25. doi:10.1007/s10519-014-9641-2

Tordjman, S., Somogyi, E., Coulon, N., Kermarrec, S., Cohen, D., Bronsard, G., … Xavier, J. (2014). Gene×environment interactions in autism spectrum disorders: role of epigenetic mechanisms. *Front Psychiatry, 5*, 53. doi:10.3389/fpsyt.2014.00053

Woldemichael, B. T., Bohacek, J., Gapp, K., & Mansuy, I. M. (2014). Epigenetics of memory and plasticity. *Prog Mol Biol Transl Sci, 122*, 305–40. doi:10.1016/B978-0-12-420170-5.00011-8

ADHD

Li, Z., Chang, S.-H., Zhang, L.-Y., Gao, L., & Wang, J. (2014). Molecular genetic studies of adhd and its candidate genes: a review. *Psychiatry Res, 219(1)*, 10–24. doi:10.1016/j.psychres.2014.05.005

Autism

Robinson, E. B., Koenen, K. C., McCormick, M. C., Munir, K., Hallett, V., Happé, F., … Ronald, A. (2012). A multivariate twin study of autistic traits in 12-year-olds: testing the fractionable autism triad hypothesis. *Behav Genet, 42(2)*, 245–55. doi:10.1007/s10519-011-9500-3

Tordjman, S., Somogyi, E., Coulon, N., Kermarrec, S., Cohen, D., Bronsard, G., … Xavier, J. (2014). Gene×environment interactions in autism spectrum disorders: role of epigenetic mechanisms. *Front Psychiatry, 5*, 53. doi:10.3389/fpsyt.2014.00053

Memory

Woldemichael, B. T., Bohacek, J., Gapp, K., & Mansuy, I. M. (2014). Epigenetics of memory and plasticity. *Prog Mol Biol Transl Sci, 122*, 305–40. doi:10.1016/B978-0-12-420170-5.00011-8

Schizophrenia

Horváth, S. & Mirnics, K. (2014). Schizophrenia as a disorder of molecular pathways. *Biol Psychiatry.* doi:10.1016/j.biopsych.2014.01.001

Political Ideology, Attitudes

Hatemi, P. K., Medland, S. E., Klemmensen, R., Oskarsson, S., Littvay, L., Dawes, C. T., … Martin, N. G. (2014). Genetic influences on political ideologies: twin analyses of 19 measures of political ideologies from five democracies and genome-wide findings from threepopulations. *Behav Genet, 44(3)*, 282–94. doi:10.1007/s10519-014-9648-8

Example of article summary format:

Caspi, A., McClay, J., Moffitt, T. E., Mill, J., Martin, J., Craig, I. W., ... Poulton, R. (2002). Role of genotype in the cycle of violence in maltreated children. *Science*, *297*, 851–854.

In this article, Caspi et al. (2002) are concerned with genetic and environmental factors affecting the later violent behavior of children who either did or didn't experience maltreatment as children. They found that …